

STUDIES IN PACIFIC COAST LEPIDOPTERA,

Continued.

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*Notes on the acmon-neurona group of Lycaenids, with
description of a new species.*

The relationship of the six species and one variety of Lycaenids comprising this group has been obscure, and several papers written to clarify the matter have unfortunately further complicated the problem. This lack of clarity results in part from the extremely brief descriptions of the earliest published species, and to some extent, from the small series which were available to the several authors who have written on the problem. An exact knowledge of the interrelations of the group will not be possible until a long series of each species has been bred under varying conditions of climate, altitude and season, but certain conclusions may be reached by a comparison of series covering a wide geographic range.

Plebeius acmon is too well known to deserve comment. Mr. Victor L. Clemence has given valuable notes on the species and its seasonal forms in the *Canadian Entomologist*, Vol. XLI, p. 38, 1909. He has pointed out the fact that the early spring form is "small in size, of a darker blue than the type form, and heavily margined in black." His remarks refer, of course to the male only. The female of this form tends to have the basal portion of primaries and secondaries heavily shot with blue, whereas the later generations are uniform slaty-brown. In the male of these later forms, the ground color is a delicate violet, and the orange band on upper side of secondaries is overshot with rose.

Boisduval's *antaegon* refers to the summer form and is undoubtedly synonymous with *acmon*.

Grinnell's *cottlei* is a race of *acmon* occurring in the San Francisco Bay region (the types taken at Bakers Beach). It is an early spring form, and can be distinguished from the typical by the "intensity, sharpness and distinctiveness of the deep purplish blue, the heavy black border; the greatly extended deep red border of the hindwings; and darker ashy-gray and distinct markings of the undersides."

Boisduval's *lupini* is undoubtedly an alpine race of acmon occurring at points in the high Sierras. In size it averages as large as *monticola*. It is difficult to separate from large specimens of the summer form of acmon, but a few points of differentiation seem fairly constant. In the male it is noted that the marginal dark band on upper side of primaries gives place gradually to the violet-blue ground color. This marginal band is also wider than in other forms of acmon. The orange band on upper side of secondaries is bordered internally with a dark shading and the color is distinctively orange whereas in typical acmon it shows a rosy lustre and is not usually internally shaded.

Plebeius monticola, Clemence is a well defined mountain race of acmon occurring in the Southern Sierras, the type locality being the San Gabriel mountains. It may be distinguished from other varieties by the silvery-blue ground color, the broad marginal band on upper side of primaries, and in the female, which is almost as blue as the male, by the broad orange band of upper side of secondaries. Both sexes show relatively heavier markings on the under side than do other forms of acmon.

Plebeius chlorina, Skinner is a form that has been much misunderstood. Dr. Skinner's first description, occurring in the Entomol. News, Vol. 13, p. 15, 1902, erroneously spoke of the female having an "overlying iridescent, very light green." This was later corrected in W. G. Wright's "Butterflies of the West Coast," where Dr. Skinner is quoted as saying "my three specimens are males." Undoubtedly the original description was of a male rather than a female as originally stated. I have a long series of this form from the type locality in the Tehachapi Mountains. The males could be considered as *monticolas* in which the silvery-blue had changed to a lustrous blue-green. On the underside of the wings they can not be distinguished from typical acmon. In size they are intermediate between typical acmon and *monticola*. The female which seems to be associated with this greenish male (though none were taken in copulation) is almost identical with large sized specimens of the summer form of acmon. The ground color of the former is perhaps more brown and the orange band on upper side of secondaries uniformly wider. Only one specimen shows a slight powdering of greenish scales on the primaries, (in the basal area). All the others are a uniform brown. There is wide variation, tending on the one hand to small specimens that are indistinguishable from acmon, and on the other to large, orange-suffused examples that approach typical females of *neurona*.

PLATE III.



1. PLEBEIUS
CAROLYNA. TYPE.
VAR. NOV.



3 PHILOTES
SPECIOSA. HY. EDW. ♂



2 PLEBEIUS
CAROLYNA VAR NOV
UNDER SIDE



4. PLEBEIUS
CHLORINA. SKIN. ♂



5. PLEBEIUS
NEURONA. SKIN. ♂



6. PLEBEIUS
EMIGDIONIS. GRIN ♂



7. PLEBEIUS
CHLORINA. SKIN. ♀



8. PLEBEIUS
NEURONA. SKIN. ♀



9. PLEBEIUS
EMIGDIONIS. GRIN. ♀



10. PLEBEIUS
CHLORINA. SKIN. UNDERS.



11. P. NEURONA.
UNDER SIDE ♂.



12. P. EMIGDIONIS
UNDER SIDE. ♀

One remarkable variation in the male, evidenced by five specimens in my series is sufficiently distinct to deserve a varietal name. I will therefore designate this.

Plebeius carolyna, form nov: naming it for my loyal co-worker and wife, Dr. Carolyn Comstock, who captured three of the five specimens in my series.

Expanse—19-25 mm.

Upper surface as in typical *chlorina*, i. e. ground color, lustrous blue-green; outer margin brown; fringes white. The nervules on outer third or fourth of primaries, orange (as in *neurona*) beginning at a point about one mm. internal to outer margin, these orange lines expand as they approach the junction between the blueish-green ground color and the marginal band; they again gradually diminish as they approach the limbal area, until they finally disappear. Secondaries, ground color bluish-green. Outer marginal orange band wide, and bordered internally with 5 points of shading in juxtaposition to the five submarginal round spots. A dark fine marginal line. Under surface, as in typical *chlorina*. Thorax, dorsal surface blackish covered with filamentous greenish scales; beneath, greyish-faun. Abdomen, dorsal surface dark shading to grey laterally, ventral surface, silvery grey.

Antennae, clubs black, segments annulated black and white.

Type locality: Tehachapi Mts. about five miles from the town of that name. Elevation 5,000 feet. The type taken on July 1st. Paratypes 1, 2, 3 and 4, taken respectively on July 7, July 11, and July 22.

Type and paratypes in the Southwest Museum Collection.

This form is in practically all respects similar to *chlorina*, but may at once be distinguished by the orange lineation on the nervules in outer portion of primaries. Possibly it may have arisen as a result of interbreeding with *neurona*, which is found in the same locality.

Plebeius emigdionis, Grinnell. Ent. news, Vol. 16, p. 115, 1905.

This species was first described by Fordyce Grinnell, Jr. from specimens taken in San Emigdio Canyon, Kern Co. Doubt was later thrown on the validity of the species by Mr. Karl Coolidge's notes in the Entom. News of 1907, Vol. 18, p. 300, who states "a later examination of Mr. Grinnell's specimen proves them to be all females, and - - - - emigdionis is probably only a variety of *acmon*."

I have taken this species in Mint Canyon, and also have a good series from Victorville, Mojave Desert, (taken in May of this year) where it flies in abundance. It is undoubtedly a valid species, totally distinct from *acmon*, which also occurs in the same district. Its flight is more energetic and its habits very different. The male and female may be easily distinguished, as a glance at the accompanying plate will determine. I have taken several pairs in copulation.

It differs markedly from all forms of *acmon* in several particulars, chief of which are:

In the male, the blue scales on upper surface are concentrated most heavily in the basal area and gradually give place to the dark marginal shading. The marginal orange band on secondaries of *acmon* is represented only by a brownish or yellow-brown suffusion on which are slight shadowy suggestions of dark spots. The type specimen has three such spots suggested, but the majority of the males show only one or two. On the under surface we find the ground color practically alike in the two sexes, whereas in *acmon* the ground color of the males is lighter. Another striking point of difference is the series of black spots distal to the reniform discal dash. In both sexes of *emigdionis* these are fully twice the size of the marginal series and are irregularly cuneiform, whereas in *acmon* they are relatively much smaller, oval in form and more evenly aligned. A clear distinction rests in the five submarginal metallic rings on under side of secondaries which are relatively much larger in *emigdionis* than in any form of *acmon*. The "orange" crescents internal to these are reduced to about $\frac{1}{2}$ mm. and are not orange but yellow. The upper surface of female may be separated from *acmon* by the broad outer yellow-brown suffusion which gradually diminishes in the limbal area. This suffusion is somewhat more concentrated along the lines of the nervules and gives a slightly "neurated" effect to the wing, which has not been noted in the authors original description, but is clearly present in the types. The figures which I show have been compared with the latter.

Plebeius neurona, Skinner. Entom. News, Jan. 1902, Vol. XIII, p. 15.

This rare and remarkable Lycaenid was first taken by W. G. Wright at Doble, an old Mining Camp in the San Bernardino Mountains. Of late years our local collectors have depended on the summit of Mt. Wilson to supply their specimens but the latter col-

ony seems now to be exhausted. The Mt. Wilson captures were all smaller than the typical, ranging from 17 to 20 mm. My wife and I have recently found a colony of *neurona* in the Tehachapi Mountains, at an elevation of over 6,000 feet from which a generous series was secured. These latter captures are all larger than the Mt. Wilson specimens, ranging from 20 mm. to 28 mm. in expanse. They are otherwise typical, and show the usual wide range of variation characteristic of the species. Dr. Skinner has stated that there are no secondary sexual characters in *neurona* but we note one difference that seems fairly constant throughout our series of 70 specimens. In the males, an orange suffusion extends along the costal margin of primaries (upper surface) which is widest at the base and tapers toward apex. Only two females in our series show any suggestion of this.

The variation in *neurona* consists principally in the degree and extent of the orange "veining." This ranges from clearly marked individuals in which every nervule is distinctly lined with orange, to specimens in which there is no orange whatsoever on the nerves and which are practically indistinguishable from *acmon* females.

The accompanying plate illustrates several of the points of differentiation which we have here analyzed. In addition to showing *Plebeius emigdionis*, *neurona*, *chlorina* and the new variety *carolyna*, there is shown a cut of the male of *Philotes speciosa*. This rare *Lycaenid* has been taken in isolated points of the Mojave Desert.

